REMARKS

With the entry of this Response, Claims 1, 17, 20-25, 27-34, 39-55, and 59 are currently under consideration. Claims 2-16, 18, 36-38, and 56-58 having been previously withdrawn as directed to non-elected subject matter. In this Response, Applicants amend Claims 1, 5, 17, 27, 29, 39, and 45. Support for the amendments to these claims can be found throughout the present application and at least at page 10 (lines 21-28) and in the language of the original claims. Applicants have also canceled Claim 26 herein without prejudice and have added new Claim 59. Applicants submit that the amendments to the claims do not introduce new matter and do not raise new issues. Support for new Claim 59 can be found throughout the present application and at least at page 10 (lines 21-28) and in the language of the original claims. In view of the amendments to the claims and the subsequent remarks, Applicants respectfully request reconsideration and allowance of all pending claims.

35 U.S.C. § 112, SECOND PARAGRAPH, REJECTION

The Office Action rejected Claim 29 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter regarded by Applicants as the invention. The Office Action stated that "TWEEN®" should be identified generically. (Office Action, p. 2). Applicants respectfully traverse this rejection to the extent that this rejection applies to the claim as amended. Claim 29 is amended herein by deleting "TWEEN®".

In view of the amendment to Claim 29, Applicants respectfully submit that the rejection is overcome and request that the Examiner withdraw this rejection and allow this claim.

35 U.S.C. § 112, FIRST PARAGRAPH, REJECTION

The Office Action rejected independent Claims 1 and 39 and dependent Claims 17, 20-34, and 40-55 under 35 U.S.C. § 112, first paragraph, as allegedly failing to "reasonably provide enablement for ANY terpene components, which can be specific terpene compounds, or derivatives, combinations, essential oils, and compositions of added ingredients, including thymol, as claimed." (Office Action, pp. 2-3). Applicants respectfully traverse this rejection to the extent that this rejection applies to the claims as amended.

Claim 26 is canceled herein without prejudice, thereby rending moot the rejection as it is applied to Claim 26. Applicants, therefore, respectfully request withdrawal of the rejection of Claim 26.

The M.P.E.P teaches that the purpose of the enablement requirement "is to ensure that the invention is communicated to the interested public in a meaningful way." (M.P.E.P. § 2164). However, a patent need not teach, and preferably omits, what is well known in the art. (M.P.E.P. § 2164, citing *In re Buchner*, 929 F.2d 660, 661 (Fed. Cir. 1991)). Therefore, any analysis of whether a particular claim is enabled by the disclosure in an application requires a determination of whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims so as to enable one skilled in the pertinent art to make and use the claimed invention without undue experimentation. (M.P.E.P. § 2165, citing *United States v. Telectronics, Inc.*, 857 F.2d 778, 785 (Fed. Cir. 1988)). The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. (M.P.E.P. § 2164.01, citing *In re Angstadt,* 537 F.2d 498, 504 (CCPA 1976)). The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. (M.P.E.P. § 2164.01). As the amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the art as well as the predictability of the art (M.P.E.P. §2164.03), whether the claims are enabled is a question of law based on underlying factual findings. (*In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991); *Atlas Powder Co. v. E.I. duPont de Nemours & Co.,* 750 F.2d 1569, 1576 (Fed. Cir. 1984)).

Applicants note that the Examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. (*In re Wright*, 999 F.2d 1557, 1562 (Fed. Cir. 1993) (explaining that the examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure)). A specification that contains a teaching of the manner and process of making and using an invention in terms that correspond in scope to those used in describing and defining the claimed subject matter must be taken as being in compliance with the enablement requirement of 35 U.S.C. §112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support (M.P.E.P. § 2164.04).

As provided by the Federal Circuit in *In re Wands*, an analysis of the following eight *Wands* factors determines whether experimentation is "undue": (1) breadth of the claims, (2)

nature of the invention, (3) state of the prior art, (4) level of ordinary skill in the art, (5) predictability of the art, (6) amount of direction provided in the specification, (7) any working examples, and (8) quantity of experimentation needed relative to the disclosure. (M.P.E.P. § 2164.01(a), citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)). The proper determination of whether experimentation is undue requires ***an analysis of all*** of the pertinent *Wands* factors. (M.P.E.P. § 2164.01(a)). The M.P.E.P. instructs that it is improper to conclude that a disclosure is not enabling based on an analysis of only one of the *Wands* factors while ignoring one or more of the others. (§ 2164.01(a)). Thus, the Office's analysis must consider all of the evidence related to each of the *Wands* factors, and any conclusion of non-enablement must be based on the evidence as a whole.

Although the Office Action listed each of the *Wands* factors, it appears to Applicants that the Office Action did not fully consider the relevance of each factor in formulating this enablement rejection. Rather, it appears that the Office Action provided generalized statements regarding each of the *Wands* factors. For example, the Office Action stated that "when the [*Wands*] factors are weighed, it is the examiner's position that the instant disclosure fails to meet the enablement requirement." (Office Action, p. 7). However, the Office Action fails to allege that any necessary experimentation would be ***undue experimentation***, which is the proper standard for an enablement rejection. For this reason alone, the Office Action has not met its burden of establishing a reason to doubt the objective truth of the statements contained within the specification that must be relied on for enabling support.

In the event that the Office maintains this rejection, Applicants respectfully request, in accordance with the principles of compact prosecution, that the Office fully develop the reasons for this rejection by articulating, on the record, those factors, reasons, and evidence that lead it to conclude that the specification fails to teach how to *make and use* the claimed invention *without undue experimentation*. (*See* M.P.E.P. § 2164.04) (emphasis in original).

Amended Claim 1 currently recites "A method of killing nematodes, said method comprising applying an effective amount of a nematicidal composition comprising hollow glucan particles, wherein the hollow glucan particles encapsulate thymol and one or more terpenes, wherein the hollow glucan particles have a lipid content greater than 5% w/w, and wherein the nematicidal composition kills nematodes." Support for amended Claim 1 can be found throughout the present application and at least in original Claim 26.

Amended Claim 39 recites "A method of preparing a nematicidal composition comprising hollow glucan particles encapsulating one or more terpenes, said method comprising; a) providing thymol and one or more terpenes; b) providing hollow glucan particles; c) incubating the thymol and the one or more terpenes with the glucan particles under suitable conditions for terpene encapsulation; and d) recovering the glucan particles encapsulating the thymol and the one or more terpenes." Support for amended Claim 39 can be found throughout the present application and at least in the language of the original claims.

Thus, independent Claims 1 and 39 do not encompass "ANY terpene components" as stated by the Office Action. Rather, Claims 1 and 39 are directed to a composition comprising thymol and one or more other terpenes. In view of these amendments, Applicants respectfully submit that the present application enables the skilled person to practice the invention commensurate in scope with the claims, and to do so, ***without undue experimentation***. Therefore, under the law, the currently pending claims are fully enabled. As such, Applicants respectfully request that the Examiner withdraw this rejection and allow these claims.

B. The Wands Factors

Although Applicants respectfully submit that the Office Action has not met the prima facie burden, Applicants aim to expedite the prosecution of these claims to allowance by now addressing the *Wands* factors.

Nature of the Invention

Contrary to the characterization provided by the Office Action, which stated that the "claims are to unqualified control and death by non-specific agents" (Office Action, p. 3), the claimed invention is directed to methods of killing nematodes and to methods of preparing nematicidal compositions comprising thymol and one or more other terpenes. Thus, the nature of the invention is one of the biological and agricultural arts and sciences, and the currently pending claims recite specific agents.

Level of Skill in the Art

Applicants respectfully submit that the level of ordinary skill in the art at the time of filing was ***high***. Applicants note that when the level of ordinary skill in the art is high, the amount of guidance or direction needed to satisfy the enablement requirement can be low.

Breadth of the Claims

Applicants' currently pending claims are drawn to methods of killing nematodes using a nematicidal composition comprising hollow glucan particles encapsulating thymol and one or more terpenes, wherein the hollow glucan particles have a lipid content greater than 5% w/w, and wherein the nematicidal composition kills nematodes, and to methods of preparing such nematicidal compositions. Applicants note that present application provides a description of terpenes and identifies several terpenes by name. As there are a finite number of terpenes, and considering the skill of the art, which is high, the skilled person - through routine experimentation – could readily prepare nematicidal compositions comprising thymol and one or more other terpenes and could readily ascertain the efficacy of various nematicidal compositions for killing nematodes. As evidenced by the enclosed data, the skilled person could do this *without undue experimentation.* Therefore, the skilled person can practice the invention commensurate with the scope of these claims.

Predictability in the Art

Contrary to the Office Action's statement that the "unpredictability of the art is very high," Applicants respectfully submit that, at the time of filing, the art can use the present application to predictably make and use the claimed nematicidal compositions comprising hollow glucan particles encapsulating thymol and one or more other terpenes. Using the present application, the art could further test the efficacy of such nematicidal compositions.

Amount of Direction provided in the Specification, the Presence of Working Examples, Further Guidance, and Quantity of Experimentation Needed Relative to the Disclosure

As provided in M.P.E.P. § 2164.03, the amount of guidance or direction needed to satisfy the enablement requirement is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. In other words, when the level of ordinary skill in the art is

high (as it is here), the amount of guidance or direction needed to satisfy the enablement requirement can be low. Applicants have already established that the skill and knowledge of the art is high and that the art can predictably make and test nematicidal compositions comprising thymol with one or more other terpenes.

In addition, Applicants submit that the present application is replete with guidance that sufficiently enables the skilled person to make the claimed nematicidal compositions and use the claimed compositions to kill nematodes. Contrary to the Office Action's statement that the "only data showing efficacy is with combinations with surfactant," (Office Action, p. 3), the present application specifically teaches the skilled person how to prepare nematicidal compositions with a surfactant and without a surfactant. The application also teaches the skilled person how to evaluate the efficacy of a nematicidal composition with a surfactant (*see*, *e.g.*, Examples 5, 8, and 10) or without a surfactant (*See*, *e.g.*, Examples 6, 7, 9, and 11). With respect to surfactants, the application states:

> Thus hollow glucan particles encapsulating terpenes appear to be as effective as terpenes in solution or with surfactant as nematicides. The nematicidal activity is retained despite the terpene being encapsulated within the particle. It can be expected that higher concentrations of terpenes within the hollow glucan particles,' or higher concentrations of the particles would result in an even higher kill rate, as is the case for terpenes in solution or with surfactant.

(*See*, p. 80, lines 7-16; *see also* p. 16, line 20 - p. 17, line 2 and p. 18, lines 9-26).

With respect to the Office Action's issue with the recitation "incubating under suitable conditions," the present application teaches the skilled person that there are considerations regarding the solubility of terpenes, the encapsulation of terpenes, and the use of terpenes to kill nematodes.

> It has been found that the terpene component can become encapsulated by the hollow glucan particles at room temperature. The rate of encapsulation is, however, increased at 37°C but the temperature should be kept below the boiling point or denaturing temperature of any component of the composition. Suitable conditions for step c) of the above method are therefore atmospheric pressure at a temperature of 20 to 37°C. Optimisation of the conditions for a particular encapsulation reaction will be a matter of routine experimentation.

(p. 20, line 23-p. 21, line 2). In view of these teachings, the present application provides the skilled person with the roadmap necessary to make and use the claimed invention.

Thus, the present application, especially Examples 12-22, demonstrate how (i) to encapsulate terpenes in hollow glucan particles, (ii) to assess loading of terpenes within the hollow glucan particles, and (iii) to determine the efficacy of the resulting nematicidal compositions.

As for the Office Action's statement that "thymol and citral was no better than citral alone," (Office Action, p. 3), Applicants note that Example 7 describes the effect of citral alone or in combination with thymol on root-knot nematode juveniles. (*See* pp. 38-40 of application). Example 7 explains that both citral and the citral/thymol combination were dissolved in water and mixed using a household blender. Example 7 does not relate to the encapsulation of thymol and one or more other terpenes by hollow glucan particles as currently claimed. Therefore, the efficacy of the combinations provided in Example 7 is irrelevant to the currently pending claims. This is especially true in view of the fact that the claimed nematicidal composition comprising hollow glucan particles can be physically consumed by nematodes. Such consumption delivers the toxic payload, *i.e.*, the terpenes, directly into the digestive tract of the nematode, which is an advantage that the cited references do not teach or suggest.

Quantity of Experimentation Necessary

The Office Action stated that the quantity of experimentation necessary is "extensive – there is no known levels of amount useful of any specific agent against any specific organism shown to exhibit death & destruction, ***without experimentation***." (Office Action, p. 4) (emphasis added). Applicants respectfully submit that the test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. Therefore, the fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. (*See* M.P.E.P. § 2164.01). In view of the teachings of the present application, the skilled person could make and use the claimed invention without undue experimentation.

Summary of Analysis of the Wands Factors

In view of the foregoing discussion, which considers the totality of the *Wands* factors, Applicants respectfully submit that the present application allows the skilled person to practice the invention commensurate in scope with the claims. Applicants remind the Examiner the *Vaeck* court stated that "[T]he disclosure must adequately guide the art worker to determine, ***without undue experimentation***, which species among all those encompassed by the claimed genus possess the disclosed utility." (emphasis added). In view of the knowledge and skill of the art and the teachings provided by the application, Applicants submit that the skilled person could make and test the claimed nematicidal compositions for utility and that such testing could be conducted without undue experimentation. While some experimentation *might* be necessary to determine the effect of the claimed nematicidal composition, the mere fact that some experimentation would be necessary is insufficient to support an enablement rejection. Even if the experimentation was complex, complex experimentation is not automatically undue experimentation. (M.P.E.P. § 2164.01). It should be clear that one of skill in the art could predictably prepare a nematicidal composition comprising hollow glucan particles, wherein the hollow glucan particles encapsulate thymol and one or more terpenes, wherein the hollow glucan particles have a lipid content greater than 5% w/w, and wherein the nematicidal composition kills nematodes. Accordingly, Applicants submit that the skilled person would not engage in undue experimentation to practice the invention commensurate with the scope of the claims. The scope of the claims is commensurate with the teachings of the application.

Additional Support for Enablement of the Claimed Invention

Applicants provide herein a Declaration of Dr. Gary Ostroff under 37 C.F.R. § 1.132 with accompanying data in the enclosed Appendix. The Declaration and the Appendix establish that the claimed nematicidal compositions can be made without undue experimentation and can be used to effectively kill nematodes. As Dr. Ostroff declares, experiments conducted under his supervision demonstrated that compositions comprising hollow glucan particles encapsulating either geraniol or citral alone were not more effective than the current industry standard known as oxamyl, which is marketed as Vydate®. However, nematicidal compositions comprising hollow glucan particles that encapsulate thymol and one or more other terpenes are more effective at killing nematodes than Vydate®. These experiments led the inventors to conclude

that the key terpene is thymol. Without thymol, the compositions do not meet industry benchmarks for commercial efficacy.

To this end, Applicants provide the enclosed Appendix, which shows the screening of different terpene compositions for the efficacy of killing nematodes. With respect to the significance of thymol, Figures 1A, 1B, and 1C of the Appendix show control of a naturally occurring infestation of the nematode *Meloidogyne incognita* in greenhouse soil or in tomatoes using various nematicidal compositions *with* and *without* thymol. Figure 1A shows that nematicidal compositions comprising hollow glucan particles encapsulating (i) geraniol and thymol (2BY) or (ii) citral and thymol (2HY) were more effective at killing the nematodes than either geraniol alone (1AY) or citral alone (1DY), respectively. Building on these results, Figure 1B shows that nematicidal compositions comprising hollow glucan particles encapsulating geraniol and thymol were more effective at killing the nematodes at both 250 ppm and 500 ppm and about equally effective at killing nematodes at 1000 ppm than those nematicidal compositions comprising hollow glucan particles encapsulating only geraniol. Figure 1C further shows that that nematicidal compositions comprising hollow glucan particles encapsulating geraniol and thymol were more effective at killing the nematodes in tomatoes at 500 ppm and about equally effective at killing the nematodes at 250 ppm and 1000 ppm than those nematicidal compositions comprising hollow glucan particles encapsulating only geraniol. The experiments in Figures 1A-1C demonstrate that the key terpene in the nematicidal compositions comprising hollow glucan particles is thymol.

Having identified the significance of thymol, Dr. Ostroff conducted additional experiments as evidenced by Figures 2-6. Figure 2 of the attached Appendix shows the control of the migratory nematode *Trichodorus spp.* using various B2Y and H2Y nematicidal compositions. B2Y comprises thymol and geraniol and H2Y comprises thymol and citral. Vydate is the industry reference standard (*i.e.*, oxamyl). Figure 2 shows that all variations of B2Y and H2Y were more effective at killing this type of nematode than was the industry standard Vydate. Figure 3 of the attached Appendix shows the control of the migratory nematode *Tylenchorhynchus spp.* using various B2Y and H2Y nematicidal compositions. The variations of the B2Y and H2Y nematicidal compositions were more effective at killing this type of nematode than was the industry standard Vydate. Figure 4 of the attached Appendix shows the control of the migratory nematode *Pratylenchus penetrans* using various B2Y and H2Y nematicidal

compositions. Four of the six variations of the B2Y and H2Y nematicidal compositions were more effective at killing nematodes than was the industry standard Vydate. Figure 5 of the attached Appendix shows that the mean weight of the carrots increased following treatment with various B2Y and H2Y nematicidal compositions. Treatment with any of the variations of the B2Y and H2Y nematicidal compositions resulted in greater mean weight than did treatment with the industry standard Vydate. Figure 5 represented the combined effect of the three aforementioned nematode species. Lastly, Figure 6 of the attached Appendix shows that percentage yield of carrots increased following treatment with various B2Y or H2Y nematicidal compositions. Treatment with any of the variations of the B2Y and H2Y nematicidal compositions resulted in greater yield than did treatment with the industry standard Vydate.

The Declaration and the data presented in the Appendix show that the skilled person could make various nematicidal compositions comprising thymol and one or more other terpenes and then test the efficacy of these nematicidal compositions against the industry standard ***without undue experimentation***. In summary, the present application provides the skilled person with the tools and information necessary to make and use the claimed nematicidal compositions comprising thymol and one or more other terpenes to kill nematodes. ***This is a process that would not require undue experimentation***. Applicants respectfully submit that the currently pending claims are enabled.

35 U.S.C. § 103 REJECTION

The Office Action rejected independent Claims 1 and 39 and dependent Claims 17, 20-26, 30, 32-34, 40-43, and 50-55 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bessette (WO 2000/053020) (herein "Bessette") in view of Pannell (EP 0242135) (herein "Pannell") in further view of Sauter *et al.* (WO 2002/012348) (herein "Sauter"). Applicants respectfully traverse this rejection to the extent that the rejection applies to these claims as amended.

In *KSR Int'l. Co. v Teleflex, Inc.*, 550 U.S. 398 (2007), the Supreme Court reaffirmed the *Graham* factors for determination of obviousness under 35 U.S.C. § 103(a). The three factual inquiries under *Graham* require examination of: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art. (*Graham v. John Deere,* 383 U.S. 1, 17-18 (1966)). Additionally, the Court in

Graham noted that a fourth consideration for the determination of obviousness would be any objective evidence of secondary considerations such as unexpected results, unmet need in the art, and commercial success.

Furthermore, to establish a prima facie case of obviousness, the Office has the initial burden of supporting the conclusion of non-obviousness. In particular, the Office is tasked with ascertaining the differences between the claims and the prior art, which requires interpreting both the art and the claims as a whole. Stated differently, "all words in a claim must be considered in judging the patentability of that claim against the prior art." (*In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970)). Moreover, "a prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention." (*W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983)). Applicants respectfully submit that the Office has failed to meet this prima facie burden as the Office Action failed to cite references that provide credible teachings of Applicants' claimed methods.

Applicants respectfully submit that the combination of cited references fails to satisfy this burden. The Office Action stated that Bessette shows "thymol a preferred element in an essential oil composition applied to lawn, garden, foliage, and soil to kill foot knot nematodes with carriers, including encapsulates." (Office Action, p. 5). The Office Action stated that Pannell teaches preparing "yeast cells by centrifugation, resulting in the hollow particles of the instant invention as claimed in open guise." (Office Action, p. 5). The Office Action stated that the "use of PANNELLI'S yeast, dead or alive, as encapsulate for BESSETTE'S thymol and other essential oils is reasonable in view of the ecological advantage therefore and the increased payload." (Office Action, pp. 5-6). Furthermore, the Office Action stated that Sauter "shows one can prepare and use glucan particles from yeast in agriculture for crop protection." (Office Action, p. 6).

In view of these teachings, the Office Action concluded that it would have been obvious to the skilled person "to try thymol and other of the few preferred essential oils of BESSETTE in the PANNELL or SAUTER microcapsules with expectation of success of encapsulation of any of the essential oils, and application to nematodes with expectation of control…." (Office Action, p. 7). For at least the reasons provided below, Applicants respectfully submit that the combination of Bessette, Pannell, and Sauter fails to teach or suggest each and every element of the currently pending claims.

In the discussion that follows, Applicants are not arguing against the references individually, as the Office Action relied on a combination of references to support the obviousness rejection. Rather, Applicants are merely highlighting the failure of the cited references to teach or suggest each and every claimed element, which is a necessary predicate to maintaining the obviousness rejection.

Claim 26 is canceled herein without prejudice, thereby rending moot the rejection as it is applied to Claim 26. Applicants, therefore, respectfully request withdrawal of the rejection of Claim 26.

Claim 1 currently recites "A method of killing nematodes, said method comprising applying an effective amount of a nematicidal composition comprising hollow glucan particles, wherein the hollow glucan particles encapsulate thymol and one or more terpenes, wherein the hollow glucan particles have a lipid content greater than 5% w/w, and wherein the nematicidal composition kills nematodes."

Claim 39 currently recites "A method of preparing a nematicidal composition comprising hollow glucan particles encapsulating one or more terpenes, said method comprising; a) providing thymol and one or more terpenes; b) providing hollow glucan particles; c) incubating the thymol and the one or more terpenes with the glucan particles under suitable conditions for terpene encapsulation; and d) recovering the glucan particles encapsulating the thymol and the one or more terpenes."

The combination of Bessette, Panell, and Sauter does not teach or suggest Applicants' independent Claims 1 and 39. First, Bessette does not provide any teaching of hollow glucan particles. Second, Pannell describes a method of encapsulation utilizing an ***intact*** microbe. For example, Pannell states:

> The present invention provides a method of producing an encapsulated material comprising treating a grown ***intact*** microbe such as a fungus, bacterium or alga by contiguous contact with an encapsulatable material in liquid form, said microbe having a microbial lipid content of significantly less than 40% by weight, said encapsulatable material being capable of diffusing into the microbial cell ***without causing total lysation*** thereof, and said treatment being carried out in the absence of an organic lipid-extending substance (as defined in European Patent Specification No. 0085805B) as solvent or microdispersant for the encapsulatable material and in the absence of a plasrnolyser, whereby the material is absorbed by the microbe by diffusion

> across the microbial cell wall and is retained passively within the microbe.

(page 2, lines 28-35) (emphasis added). Furthermore, Pannell explains:

> The microbe is in ***grown form***, i.e. it has been harvested from its culture medium, and ***is intact***, i.e. ***not lysed***. Suitably the microbe is ***alive***, at least at the commencement of the treatment; however, a microbe which has been subjected to conditions (such as by irradiation of the microbe) to destroy its ability of propagate may be employed.

(page 2, lines 41-44; see also Claim 1 and Abstract for references to an ***intact*** microbe) (emphasis added). Thus, Pannell specifically teaches a method of encapsulation in which an ***intact*** microbe is incubated with a material to result in an encapsulation. All examples provided by Pannell require an ***intact*** microbe.

The ***intact*** microbe of Pannell is not a teaching or suggestion of a ***hollow glucan particle*** as currently claimed. Rather, Pannell **teaches away** from the claimed invention. In fact, Pannell teaches the use of an ***intact*** and preferably ***alive*** microbe to effectuate an encapsulation. Moreover, contrary to the Office Action's statement that Pannell's centrifugation of yeast cells results in the claimed invention, Applicants note that purpose of centrifugation in the cited Example is to separate the particles from the distilled water in which they are washed. As would be recognized by the skilled person, centrifugation at 800 rpm for 10 minutes would not result in the lysing of the particles.

Here, Applicants are not arguing for a rigid application of the teaching-suggestion-motivation (TSM) rationale, which requires that a printed statement be present for a finding of obviousness. Instead, Applicants submit that the Supreme Court acknowledged that the TSM test was one of a number of valid rationales that could be used to determine obviousness. (*KSR* at 1727 (2007); *see* M.P.E.P. § 2141; *In re Kahn*, 441 F.3d 977, 986 (Fed. Cir. 2006)). As Pannell teaches away from the claimed invention by requiring that an alive, intact microbe to be used during the encapsulation process, Applicants respectfully submit that there is no suggestion or motivation to make the proposed modification to an alive, intact microbe as taught in Pannell to arrive at the currently claimed invention, which recites hollow glucan particles. Hollow glucan particles are not alive.

Furthermore, modification of the alive, intact microbe taught in Pannell to create the hollow glucan particle taught in the present application would render Pannell unsatisfactory for its intended purpose. According to the Federal Circuit, "[i]f [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed invention." (*In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984); *see* M.P.E.P. § 2143.01). Therefore, any attempt to create a hollow glucan particle encapsulating thymol and one or more other terpenes as disclosed in the present application would result in a particle that is unsatisfactory for the intended purpose of the microbe taught in Pannell.

Third, with respect to Sauter, Applicants note that Sauter discloses the use of lysed particles as a carrier. Sauter specifically requires the removal of "contaminating lipids" using lipases or solvent extraction. (p. 5, l. 35; p. 7, l. 33 – p. 8, l. 2; p. 8, l. 29 – p. 9, l. 6)). Accordingly, upon reviewing Sauter in view of Bessette, the skilled person would be motivated to use highly-purified particles with substantially zero percent lipid content. This is not a teaching or suggestion of the currently claimed invention, which recites "a lipid contentt of greater than 5% w/w." Rather, Sauter **teaches away** from the claimed invention. In fact, Sauter requires the removal of the "contaminating lipids" through treatment with lipases or solvents. As Sauter teaches away from the claimed invention by requiring the elimination of lipids from the glucan particles, Applicants respectfully submit that there is no suggestion or motivation to make the proposed modification to Sauter's lipid-free glucan particles to arrive at the currently claimed invention, which recites hollow glucan particle having a lipid content of greater than 5% w/w.

Furthermore, Applicants note that the use of the hollow glucan particles with a lipid content of greater than 5% w/w have a distinct advantage over the Sauter lipid-free particles. The skilled person would recognize that the lipid content of the glucan particles plays a key role in the uptake and, therefore, the successful encapsulation of a nematicidal composition. Terpenes are attracted to the hollow glucan particles and are subsequently encapsulated therein as a result of the hydrophobic nature. The hydrophobic nature of the hollow glucan particles is tied to lipid content. Accordingly, hollow glucan particles having a lipid content of greater than 5% w/w, as currently claimed, achieve a higher loading of the nematicidal composition into the hollow glucan particles, thereby providing a more cost-effective, efficient, and efficacious product than currently offered by the market. Conversely, the purification of the Sauter particles results in

particles that cannot absorb significant amounts of terpenes. This is evident from Example 6 in Sauter, which shows that only 4 mg of eugeniol per gram of particle (0.4% w/w) was absorbed by the lipid-free glucan particles. In contrast, the currently claimed hollow glucan particles can absorb more than 1000 mg of terpene per gram of particle.

Moreover, Applicants respectfully traverse the Office Action's statements that there are "no non-obvious and/or unexpected results" and that "Applicant has not provided any objective evidence of criticality, nonobvious or unexpected results that the administration of the thymol, as claimed, provides any greater or different levels of prior art expectation as claimed." (Office Action, pp. 6, 7). As described above, the lipid-free Sauter particles cannot absorb significant amounts of terpenes (*i.e.*, 4 mg of eugeniol per gram of particle (0.4% w/w)), while the currently claimed hollow glucan particles can absorb more than 1000 mg of terpene per gram of particle. Applicants also refer the Examiner to the § 1.132 Declaration and Appendix provided herein, which Appendix provides at least 5 different examples of how nematicidal compositions comprising thymol and one or more other terpenes are consistently more effective at killing nematodes than the currently accepted industry standard, Vydate.

The Office Action has not provided a combination of references that teach or suggest all the elements of the currently claimed invention. Even if the references disclosed each of the claimed elements, which they do not, the Supreme Court in *KSR* confirmed that it is legally insufficient to merely point to the various recited elements. Instead, the Office Action must identify the basis for the alleged modification or combination by one of ordinary skill to arrive at the claimed invention.

> As is clear from cases such as *Adams*, a ***patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.*** Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

(*KSR* at *37-*38) (emphasis added). To this end, Applicants note that the combination of Bessette, Pannell, and Sauter fails to provide the skilled person with any motivation to modify the teachings of any reference to successfully arrive at the claimed invention, which comprises ***hollow glucan particles having a lipid content greater than 5% w/w and comprising thymol and one or more other terpenes***. Absent explicit reasoning to support the basis for such a modification or combination, the alleged modification or combination cannot support a prima facie obviousness rejection.

It is clear that the Office Action relied on impermissible hindsight for picking selected elements from each cited reference to allege that the claimed invention is obvious. The construction of the cited references to include the elements of the present invention requires hindsight reasoning, which the Federal Circuit has explicitly rejected. (*In re Fritch*, at 1260 ("Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious.")). The Supreme Court has also warned that the Office must be mindful of the danger of hindsight bias. (*See, e.g.*, *Graham*, 383 U.S. at 36 (consideration of secondary factors "serve[s] to guard against slipping into use of hindsight and to resist the temptation to read into the prior art the teachings of the invention in issue"); *In re Kotzab*, 217 F.3d 1365, 1369 (Fed. Cir. 2000) ("[T]he very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.")).

Therefore, the combination of Bessette, Pannell, and Sauter fails to render as obvious Applicants' independent Claims 1 and 39. As "dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious" (*In re Fine*, 5 U.S.P.Q. 2d 1569, 1600 (Fed. Cir. 1988)), this combination also fails to render obvious dependent Claims 17, 20-25, 30, 32-34, 40-43, and 50-55. Applicants respectfully request that the Examiner withdraw this rejection and allow these claims.

DOUBLE PATENTING REJECTIONS

On the ground of nonstatutory obviousness-type double patenting, the Office Action provisionally rejected Claims 1, 17, 20-35, and 39-55 as allegedly being unpatentable over

Claims 1-31, 35-47, 52-66, 69, and 82 of co-pending U.S. Patent Application No. 11/597,116 (U.S. Patent Application Publication No. 2010/0040656).

On the ground of nonstatutory obviousness-type double patenting, the Office Action provisionally rejected Claims 1, 17, and 20-35 as allegedly being unpatentable over Claims 1-17, 22-31, and 35-45 of co-pending U.S. Patent Application No. 10/488,130 (U.S. Patent Application Publication No. 2004/0248764).

Claim 26 is canceled herein without prejudice, thereby rending moot the rejection as it is applied to Claim 26. Applicants, therefore, respectfully request withdrawal of the rejection of Claim 26.

Applicants respectfully submit that until such time that the Examiner finds allowable subject matter, a complete determination regarding the merits of these provisional double patenting rejections cannot be made. But, if the Examiner finds allowable subject matter in one or both of the cited applications, Applicants will then consider the filing of a terminal disclaimer.

NEW CLAIM 59

For all the reasons stated above, new Claim 59 is patentable.

CONCLUSION

The foregoing is a complete response to the Final Office Action mailed April 18, 2011. Applicants respectfully submit that at least Claims 1, 17, 20-25, 27-34, 39-55, and 59 are patentable. Early and favorable consideration is solicited. Applicants file this Response solely to facilitate prosecution. Applicants reserve the option of prosecuting the withdrawn claims at another time or requesting rejoinder of the withdrawn claims once allowable claims are found.

If the Examiner believes there are other issues that can be resolved by a telephone interview, or that there are informalities that remain in the application that may be corrected by the Examiner's amendment, then a telephone call to the undersigned attorney at (678) 420-9300 is respectfully solicited.

With this Response, Applicants also submit a Request for Continued Examination, a Petition for a three-month Extension of Time, a Declaration under 37 C.F.R. § 1.132 with an Appendix containing Figures 1-6, Dr. Ostroff's curriculum vitae, and a credit card payment. The credit card payment is in the amount of $2200, which represents the $1270 large entity fee

pursuant to 37 C.F.R. § 1.17(a)(3) for a three-month extension of time, and the $930 large entity fee pursuant to 37 C.F.R. § 1.17(e) for a Request for Continued Examination. Applicants submit that this is the correct amount due; however, Applicants authorize the Commissioner to charge to Deposit Account No. 14-0629 any additional fee that may be required to effect the consideration and entry of this Response, or to return to the same account any overpayment of fees.

Respectfully submitted,

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